DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks, filed November 23, 2009, with respect to the objection to the drawings have been fully considered and are persuasive. The drawing objection has been withdrawn.

2. Applicant's arguments, see Remarks, filed November 23, 2009, with respect to the 35 USC § 101 rejection of claims 7-10, the 35 USC § 112, 1st paragraph of claims 8-10, and the 35 USC § 103(a) of claims 4, 6, 8, and 10 have been fully considered and are persuasive. As these claims have been cancelled, the §§ 101, 112, and 103 of the claims have been withdrawn.

3. Applicant's arguments filed November 23, 2009, with respect to the 35 USC § 103(a) rejection of claims 1-3 and 5 have been fully considered but they are not persuasive.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

The Applicant's arguments consist of several pages of discussion of the Applicant's invention, the disclosure of *McVey*, and a discussion of how *McVey* relates to inventive aspects of Applicant's disclosure. The Remarks fail to point to any claim

recitations which are not taught by the *McVey* and *Bingham* references. Therefore, no specific arguments are addressed in this response.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over McVey, European Patent Application EP 1,120,944 in view of *Bingham,* U.S. Patent No. 5,228,062.

Regarding claim 1, *McVey* discloses a quadrature modulation apparatus (Fig. 1) comprising: an in-phase signal means (mixer 38, paragraph [0020]) that outputs an in-phase conversion signal (signal from mixer 38 to summer 40, paragraph [0020]) by mixing an in-phase local signal of a predetermined local frequency (signal from oscillator 34 to mixer 38, paragraph [0020]) with an in-phase correction user signal (I signal 25, paragraph [0020]) obtained by adding (summer 80, paragraph [0029]) an in-phase user signal (I digital datastream 117, paragraph [0029])to an in-phase correction signal (I OFFSET, paragraph [0029] and [0037]); a quadrature signal converter (mixer 42, paragraph [0020]) that outputs a quadrature conversion signal (signal from mixer 42 to summer 40, paragraph [0020]) by mixing a quadrature local signal (signal from oscillator 34 to mixer 42, paragraph [0020]) which is different in phase by 90 degrees

from the in-phase local signal (see phase adjustment of 90 degrees by ninety degree splitter 36, paragraph [0020]), with a quadrature correction user signal (Q signal 21C, paragraph [0029])obtained by adding (summer 88, paragraph [0029]) a quadrature user signal (I digital datastream 121, paragraph [0029]) to a quadrature correction signal (Q OFFSET, paragraph [0029] and [0037]), which is different in phase by 90 degrees from the in-phase correction signal (Because the signal the Q OFFSET is modifying is offset from the I signals by 90 degrees, one of Application/Control Number: 10/578,006 Page 7 Art Unit: 4147 ordinary skill in the art would appreciate that although not explicitly stated, the Q OFFSET would be 90 degrees different from the I OFFSET signal above); an adder that adds the in-phase conversion signal to the quadrature conversion signal (summer 40, paragraph [0020]); an output voltage measurer that measures an output voltage of said adder (Amplitude Detector 44, see paragraph [0021] which discusses detecting the magnitude of the modulated output signal 12 with circuitry that includes an analog-to- digital converter, which detects voltage and outputs a digital representation of that voltage); and an error determiner that determines an error of the quadrature modulation based upon the measurement result of said output voltage measurer (IQ Correction Code 46,146, see paragraphs [0037]-[0043]).

McVey fails to disclose mixing an in-phase local signal of a predetermined local frequency with an in-phase correction user signal obtained by adding an in-phase user signal to an in-phase correction signal] of a sinusoidal voltage. However, in a reasonably related field of endeavor, *Bingham* discloses mixing an in-phase local signal of a predetermined local frequency with an in-phase correction user signal obtained by

adding an in-phase user signal to an in-phase correction signal] of a sinusoidal voltage (see column 7, line 46 to column 8, line 9 discussing after calculating amplitude and phase errors, to apply a lookup table to sinewave generators 100 and 105 that serve to create a complex correcting signal with a sinusoidal voltage). Further, the disclosure of *Bingham* has the advantage of correct the sinusoidal I modulation signal for errors in a feedback loop, which has the benefit of error reduction. Therefore, for at least this reason, it would have been obvious to one of ordinary skill in the art to incorporate the above-mentioned elements of *Bingham* into the invention of *McVey.*

Regarding claim 2, *McVey* disclose said error determiner measures the error of the quadrature modulation based upon a relationship of the output voltage of said adder with respect to the phase of the in-phase correction signal or the quadrature correction signal ([0039|).

Regarding claim 3, *McVey* disclose said error determiner determines an error relating to an amplitude (see amplitude detector and discussion in paragraphs [0037| relating to magnitude and I/Q gain error), an orthogonality (quadrature error discussed in paragraphs [0037|-[0039| as orthogonality is the 90 degree separation between the I and Q carriers), and an offset of the in-phase user signal and the quadrature user signal (paragraph [0039| discussing calculating the I/Q phase error between the I modulation component and the Q modulation component using a history of the output signal).

Regarding claim 5, the combination of *McVey* and *Bingham* disclose the elements recited in claim 5 for at least the reasons discussed in claim 1 above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-3236. The examiner can normally be reached on Monday - Friday 9:30 AM - 6:00 PM.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on (571)272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Erin M. File/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611